MILLION Solar ROOFS

SUCCESS STORIES

The goal of the Million Solar Roofs Initiative is to install one million solar energy systems on U.S. buildings by 2010. President Clinton announced the Initiative on June 26, 1997 in a speech before the United Nations Session on Environment and Development. The Initiative focuses on two types of solar energy technology — photovoltaics that produce electricity from sunlight, and solar thermal systems that produce heat for domestic hot water, space heating or heating swimming pools. The U.S. Department of Energy leads this effort in partnership with the building industry, other federal agencies, utilities, the solar energy industry, financial institutions, state and local governments, and non-governmental organizations. These partnerships concentrate on removing market barriers and developing and strengthening demand for solar energy products and applications. As progress is made toward the goal of one million solar roofs, greenhouse gases and other harmful emissions will be reduced, high tech jobs will be created, and the U.S. solar energy industry will retain its competitive edge.

Project: Moanalua Terrace

Type: Solar Hot Water Systems

Location: Oahu, Hawaii

Background: With ideal climatic conditions, solar water heating systems have been operating effectively in Hawaii for years. Systems were installed by homeowners, typically with available materials placed on roofs connected to storage tanks that provided hot water.

In the late 1970s, the Navy installed systems in a pilot program at Barber Point Naval Air Station. However, efforts to implement installation projects on a larger scale in the 1980s were not successful and the criteria for energy conservation projects favored quick theoretical payback periods with minimum capital investments. As a result heat pumps were installed instead. More that 3000 heat pump systems were installed between 1985 and 1987. These systems, when employed, were not as efficient as expected because of several factors. These factors included noise when systems were installed in living areas, inadequate ventilation, and inadequate storage capacities to accommodate peak demand periods. In the early 1990s, attempts to include solar water heating systems in new construction projects for 236 homes at Barbers Point were not successful. The first breakthrough occurred in 1993, when the winning contractor, Hunt Building Corporation, provided solar water heating systems as an added value item in a turnkey project involving 322 units at Doris Miller Park (158) and Pearl City (164). This is where solar installation began for the Navy. This project did not qualify for any utility rebates since rebate programs were not approved by the Public Utilities Commission until mid 1996.

During the construction of Doris Miller Park and Pearl City, Eileen Yoshinaka of the Department of Energy Hawaii Regional Support Office, met with Ted Arakaki, a mechanical engineer, who later became the

energy conservation and utilities manager for Naval Housing. They discussed the installation of solar water heating systems and Ms. Yoshinaka gave him the details of all the failing attempts of installing solar. Mr. Arakaki took this information and did his own life cycle cost analysis, found that it was cost effective, and got in touch with Hawaii Electric Company (HECO). The concept was presented to the Pacific Division of Naval Facilities Engineering Command, where it was accepted. The solar hot water systems were then added to the Moanalua Terrace Phase II contract. Hawaii has since added solar water heating systems to other military construction (MILCON) and revitalization contracts. 713 units at Moanalua Terrace Phase III & IV and Pearl City will be coming on line starting in November 1998.

System Description: 136 solar hot water heaters were installed during Phase II on Moanalua Terrace Navy Family Housing. Each collector is 4 feet by 8 feet and the system stores 80 gallons of water.

Climate: Average peak sun hours are 5.8 hours per day annually.

Financing: The U.S. Navy was able to install the solar hot water systems as a result of the HECO Residential New Construction Rebate and Residential Efficient Water Heating Rebate Programs. The rebate program provides $1,500 per solar water heating system. The total rebate to the Navy for this project was $204,000. Utilizing the HECO rebate program, it is very economically feasible to install solar. All future solar installations will be incorporated into the MILCON or revitalization contract.

Total Installed Cost: $235,000 for Phase II

Optimum Maintenance cost: None

Savings: Annually, the systems installed during Phase II are saving $34,000 in energy costs and $510,650 over the lifetime of the systems (based on 15 year minimum).

Environmental benefits: Annually, 1,045 barrels of oil are being saved which amounts to 15,674 barrels over the lifetime of the systems. Annually, this amounts to a savings of 1.1 million pounds in carbon dioxide emissions, 3,640 pounds of sulfur dioxide emissions, 3,385 pounds of nitrous oxide emissions, and 502 pounds of particulate matter emissions. Over the lifetime of these 136 systems, they will save 16.5 million pounds of carbon dioxide, 54,550 pounds of sulfur dioxide, 50,785 of nitrous oxide, and 7,524 of particulate matter from polluting the atmosphere.

Contact: For additional information on the Moanalua Terrace project, contact Ted Arakaki, Naval Housing, 808-471-9630, ext 304, or Keith Block, HECO, 808-543-4792 or Ron Richmond, HECO, 808-543-4784

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